

Appln. No. 10/777,225
Reply to the Office Action of April 8, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1. (Currently Amended) A process of hydrodesulfurizing a hydrocarbon mixture, which comprises:

reacting said hydrocarbon mixture containing olefins and boiling within the range of C₄ to 250° C, and having a sulfur content of at least 150 ppm with hydrogen at a temperature ranging from 250° C to 330° C, at a pressure ranging from 5 to 10 kg/cm², at a WHSV ranging from 2 to 6 hours⁻¹ and with a quantity of hydrogen ranging from 200 to 400 times the quantity of hydrocarbons present (N1/l) in the presence of a catalytic composition comprising:

a) an acidic carrier consisting of a silica and alumina gel, amorphous to X-rays, with a molar ratio SiO₂/Al₂O₃ of 30/1 to 500/1, having a surface area ranging from 500 to 1000 m²/g, a porosity of 0.3 to 0.6 ml/g and a pore diameter within the range of 10-40 Å; and

b) a mixture of ~~metals belonging to Groups VIIB and VIII of the Periodic Table molybdenum and cobalt~~ deposited on the carrier in an overall quantity ranging from 2 to 67 % by weight with respect to the total amount of components (a) + (b), thereby effecting said hydrodesulfurization with concomitant skeletal isomerization of the olefins of said mixture under the hydrogenation conditions of the process which results in a ratio HYD/ISO ranging from 0.7 to 2.5, wherein HYD is the ratio of non-isomerized olefins that have been

hydrogenated to olefins in the hydrocarbon mixture and ISO is the ratio of isomerized, hydrogenated and non-hydrogenated olefins to the sum of isomerized, hydrogenated and non-hydrogenated olefins and non-isomerized hydrogenated and non-hydrogenated olefins.

Claim 2. (Original) The process according to claim 1, wherein the acid carrier of the catalyst has a ratio $\text{SiO}_2/\text{Al}_2\text{O}_3$ ranging from 50/1 to 300/1 and a porosity of 0.4 to 0.5 ml/g.

Claims 3-5. (Canceled)

Claim 6. (Currently Amended) The process according to claim 1 or 3, wherein the ~~metal of Group VI B molybdenum~~ is present in a quantity ranging from 5 to 50 % by weight with respect to the total of the carrier and the mixture of metals and ~~the metal of Group VIII cobalt~~ is present in a quantity ranging from 0.5 to 10 % by weight with respect to the total of the carrier and the mixture of metals.

Claim 7. (Currently Amended) The process according to claim 6, wherein ~~the metal of Group VI B molybdenum~~ is present in a quantity ranging from 8 to 30 % by weight and ~~the metal of Group VIII cobalt~~ is present in a quantity ranging from 1 to 5 % by weight.

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Claim 8. (Currently Amended) The process according to claim 1 or 3, wherein the molar ratio of ~~the metal of Group VIII cobalt to the metal of Group VI B molybdenum~~ is less than or equal to 2.

Claim 9. (Original) The process according to claim 8, wherein the molar ratio is less than or equal to 1.

Claim 10. (Currently Amended) The process according to claim 1 or 3, wherein the silica and alumina gel carrier is in the form of an extruded product with a ligand.

Claim 11. (Previously Presented) The process according to claim 10, wherein the ligand is selected from the group consisting of aluminum oxide, boehmite and pseudoboehmite.

Claim 12. (Previously Presented) The process according to claim 10, wherein the silica and alumina gel carrier and the ligand are premixed in a weight ratio ranging from 30:70 to 90:10 and consolidated into the desired end-form.

Claim 13. (Currently Amended) The process according to claim 10, wherein the silica and alumina gel in extruded form is prepared as follows:

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a) preparing an aqueous solution of a tetraalkylammonium hydroxide (TAA-OH), a soluble compound of aluminum capable of hydrolyzing to Al₂O₃ and a silicon compound capable of hydrolyzing to SiO₂, in the following molar ratios:

SiO₂/Al₂O₃ from 30/1 to 500/1;

TAA-OH/SiO₂ from 0.05/1 to 0.2/1;

H₂O/SiO₂ from 5/1 to 40/1;

b) heating the solution thus obtained to cause hydrolysis and gelation thereby preparing a mixture A with a viscosity ranging from 0.01 to 100 Pa sec;

c) adding to the mixture A first a ligand belonging to the group of boehmites and pseudoboehmites, in a weight ratio with the mixture A of 0.05 to 0.5, and then a mineral or organic acid in a quantity ranging from 0.5 to 8 g per 100 g of ligand;

d) mixing and heating the mixture obtained in step (c) to a temperature ranging from 40° to 90° C until a homogeneous paste is obtained, which is subjected to extrusion; and

e) drying the extruded product and calcining the dried product in an oxidizing atmosphere.

Claims 14 and 15. (Canceled)

Claim 16. (Previously Presented) The process according to claim 1, wherein the hydrocarbon mixture which is subjected to desulfurization contains more than 600 ppm of sulfur.

Claim 17. (Currently Amended) The process according to claim 1, wherein the hydrocarbon mixture which is subjected to hydrodesulfurization is a mixture that boils that boils within the range of C₅ to 220° C.

Claim 18. (Previously Presented) The process according to claim 1, wherein the catalyst is activated by sulfidation.

Claims 19-26. (Canceled)

Claim 27. (Previously Presented) The process according to claim 1, wherein the hydrocarbon mixture is a full range naphtha having a boiling range of 35° -250° C.

Claim 28. (New) A process of hydrodesulfurizing a hydrocarbon mixture, which comprises:

reacting said hydrocarbon mixture containing olefins and boiling within the range of C₄ to 250° C, and having a sulfur content of at least 150 ppm with hydrogen at a temperature ranging from 250° C to 330° C, at a pressure ranging from 5 to 10 kg/cm², at a WHSV ranging from 2 to 6 hours⁻¹ and with a quantity of hydrogen ranging from 200 to 400 times the quantity of hydrocarbons present (N1/l) in the presence of a catalytic composition comprising:

a) an acidic carrier consisting of a silica and alumina gel, amorphous to X-rays, with a molar ratio $\text{SiO}_2/\text{Al}_2\text{O}_3$ of 30/1 to 500/1, having a surface area ranging from 500 to 1000 m^2/g , a porosity of 0.3 to 0.6 ml/g and a pore diameter within the range of 10-40 Å; and

b) a mixture of molybdenum and cobalt deposited on the carrier in an overall quantity ranging from 2 to 67 % by weight with respect to the total amount of components (a) + (b), thereby effecting said hydrodesulfurization with concomitant skeletal isomerization of the olefins of said mixture under the hydrogenation conditions of the process which results in a ratio HYD/ISO ranging from 0.7 to 2.5, wherein HYD is the ratio of non-isomerized olefins that have been hydrogenated to olefins in the hydrocarbon mixture and ISO is the ratio of isomerized, hydrogenated and non-hydrogenated olefins to the sum of isomerized, hydrogenated and non-hydrogenated olefins and non-isomerized hydrogenated and non-hydrogenated olefins and which results in a ratio HDS/HYD of at least 1.9, wherein HDS is hydrodesulfurization conversion and HYD is as defined above.